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Articles



Ecology & Environment

Recycling - A Solution?

Coping with Tokyo's Mountain of Waste

By Ruediger Kuehr

During the 1960s, it was advisable to permanently carry a fly swatter if one lived in the districts close to Tokyo Bay. In fact, the inhabitants of Tokyo have been trying to control invasions of flies during warm weather in these coastal areas since the spring of 1965. The flies originated from an island called Yumenoshima (Island of Dreams).

Yumenoshima, like almost all other islands in Tokyo Bay, is artificial - built out of millions of tons of household waste sandwiched between layers of clay, sand, or soil obtained free from construction projects within Metropolitan Tokyo. Returning ships from the landfill site might have contributed to the spreading of flies on land. Pressure from all over Japan was put on Tokyo's Metropolitan Government to deal with this torment. To control the plague, some suggested reviving methods used by the Japanese military at the Chinese front during the Second World War. Finally, large segments of Yumenoshima were burned in June 1970 with the help of one division of Japan's Self Defense Forces and Tokyo's Fire Brigade.

Today, Yumenoshima is connected with the mainland by bridges and a subway line. On the Island of Dreams, the city fathers developed a recreation area with parks, a tropical garden, and a swimming pool. But next to the tropical greenhouse and playground an incineration plant was constructed.

The golf course Yakushu was also built on one of these former landfill sites. Signs strictly prohibit smoking there because through small apertures, methane, produced by decaying waste, continues to seep out, so that golfers are literally in danger of blowing themselves up.

Landfill Disposal

Basically, each municipality is responsible for the disposal of general waste in Japan.

Administratively, Metropolitan Tokyo, as Japan's political, economic, and cultural center, is a prefecture made up of the ward district (23 special wards), the Tama district, and 41 cities, towns, and villages on the Izu and Ogasawara islands.

The municipalities in the Tama area and the islands dispose of their general wastes independently. In the 23 wards, area wastes are collected and transported by the Bureau of Public Cleansing, and several waste disposal firms, licensed by the Metropolitan Government, are commissioned by businesses and offices producing large quantities of waste. Some businesses and offices carry their wastes directly to Metropolitan disposal facilities.

Landfill disposal of wastes in Tokyo Bay - from which the likes of Yumenoshima and Yakushu have emerged - has been going on for more than 300 years. And today it is impossible owing to cramped urban surroundings, the shortage of land, and consequently the highest land prices in the world, to find space to dump Tokyo's rubbish on land.

In fiscal 1993 the total amount of waste dumped through landfilling came to 2.37 million tons. The present landfill site, in use since October 1977, for the disposal of wastes is the Outer Central Breakwater Landfill Site (OCBLS) with a total landfill area of 314 ha. The transfer of the waste is carried out mainly by ships from five ship transfer stations. Trucks leaving five more waste transfer stations are burdening Koto Ward on their way to the OCBLS and the incineration plant on Yumenoshima. The predominately poor inhabitants of Koto Ward declared war on Tokyo's waste with road blocks and protests to the local government in 1974 and 1991 because up to 6,000 trucks rumble through their ward daily. At the OCBLS, landfilling is being carried out so that every three-meter layer of waste is covered with a 50 cm layer of earth up to a height of 30 meters above sea level. Measures to prevent pollution at the landfill disposal sites are mainly designed to prevent the pollution of the surrounding sea in Tokyo Bay. Steel tubing sheet piles, driven down to 45 meters below sea-level, and the layers of clay work to prevent pollution from leaking from the waste. About 11,000 cubic meters of seeping water is collected daily and finally discharged into sewage pipes. To prevent another invasion of flies like that 26 years ago, the disposal site is sprayed with insecticides.

Before this year is out OCBLS will be filled up, and the next and possibly final landfill site in Tokyo Bay will last only two decades because of limited capacity, even if all possible measures to reduce the volume of waste are carried out. Thus a newly created landfill site is a limited resource. A "trash shock" - like an "oil shock" - occurs regularly due to limited landfill space.

Incineration

The total volume of waste in the 23-ward area of the Tokyo Megalopolis increased sharply from 3.79 million tons in fiscal 1985 to 4.90 million tons in fiscal 1989. A comparison of volumes shows that the figure has increased by almost 30 percent. From 1985 to 1990 the number of inhabitants in the ward area decreased from 8.36 million to 8.16 million. In the 1990s, Tokyo's waste output has shown a decreasing tendency in four consecutive years down to 4.4 million tons. Nevertheless, the shortage of land, increasing thoughtless consumption, and overcrowded cities are causing an inconceivable mountain of waste all over the world.

Urban authorities have been promoting incineration as one important technique to reduce the 12,000 tons of waste Tokyo's wards have been producing every day for some time now. In fiscal 1993, 78 percent of the wastes collected by the Bureau of Public Cleansing and several waste disposal firms was combustible. Although 13 incineration plants located inside the ward area - one of them surrounded by the recreational area on Yumenoshima - are operating 24 hours a day, the capacity is absolutely stretched to the limit. Thus 0.2 million tons, or 5.8 percent of the total amount of 3.4 million tons in fiscal 1993, were sent directly for landfill disposal. Furthermore, the

incineration of 3.1 million tons of combustible wastes produced nearly 0.5 million tons of incineration ashes, including hazardous substances such as chlorides and heavy metals. The ash was mainly used to enlarge Tokyo's downtown airport, Haneda. Since the Haneda Offshore Landfill Site was totally filled up by 1991 the incineration residues are sent to the OCBLs, the only existing landfill site in the breakwater of Tokyo Bay.

The local government emphasizes that up-to-date measures are being taken to protect the environment from exhaust fumes and sewage caused by incineration. Nevertheless, the sewage from the incineration plants in Katsushika and Adachi wards is sent directly into the Naka and Ayase rivers.

The construction of an additional incineration plant and the rebuilding and renovation of some older plants will still not be enough to burn all combustible wastes collected in Tokyo. Moreover, it is uncertain if Tokyo's Incineration Plant Construction Plan to build 10 additional plants by the year 2010 will not encounter "not-in-my-backyard" resistance by Tokyo's residents generally, not only in the surrounding neighborhoods.

Environmental Risks

Both types of waste disposal -- landfill disposal and incineration -- have adverse effects on the environment, termed "environmental risks," which are divided into three categories:

Type I: Living Environmental Risk

Possible direct effect of wastes on the living environment, e.g., public health

Type II: Community Environmental Risk

Effect on the community environment of a pollutant generated in a waste disposal process, e.g., exhaust gas from incineration

Type III: Global Environment Risk

Possible effect of the above two types on the global environment, e.g., generation of greenhouse gases by landfill disposal

In addition to the fact that smoking is prohibited on the golf-course of Yakushu, escaping methane gas from the waste decaying in landfill sites is also polluting the community environment. Methane as well as carbon dioxide, which is the main exhaust gas during incineration, are responsible for global warming and, thus, a Type III risk. As equipment to deal with hydrogen chloride, sulfur oxide, and nitrogen oxide in the emissions of incineration plants has been installed there are attempts to improve highly effective measures against emissions.

Moreover the waste gas is regularly analyzed for dioxin and other toxic substances. Negative effects on the surrounding neighborhood of incineration plants are not yet documented.

On some of the artificial islands authorities trap methane gas and use it for the production of electricity. The surplus heat released during incineration is used in some of the 13 plants operate the plant and to provide air conditioning inside, as well as to heat gyms, pools, community centers, and other public facilities, including the Shinagawa Housing Complex.

Notwithstanding this, in many cases special pollution prevention agreements have to be concluded with local residents to make new disposal facilities acceptable for the residents.

Also, even if the residual heat of incineration is used effectively and fossil fuel can be saved (e.g., for heating water), it is still doubtful if these measures can really lead to the reduction of global environmental risk. Furthermore, special pollution prevention agreements will not help to raise the acceptance of incineration plants within inhabited areas. Growing environmental consciousness will lead to more public debate as is already usual in some Western countries like Germany.

Three Rs in Environmental Waste

Waste reduction and recycling

"Aiming ultimately at achieving a zero-waste society, policies shall be promoted, firstly to minimize the generation of waste; secondly to reuse products; thirdly to promote the recycling of materials and utilization of heat generated from waste incineration; and finally to promote sound waste disposal..."

(Japan Environment Summary: Outline of the Basic Environment Plan. Vol. 22. No. 5. Tokyo 10 January 1995. p. 2.)

On 16 December 1994, the Japanese Government established the Basic Environment Plan (BEP). Following the provisions of the Basic Environment Law (enacted in 1993) this Plan outlines the overall and long-term policies of the government for environmental conservation. One of the world's most important tasks at present is the conservation of resources. Conserving resources must be added to the objectives of waste disposal, which are "public health promotion" and "conservation of the living environment." BEP proposes "three Rs" to achieve the long-term objectives to overcome environmental problems caused by an unprecedented amount of waste: Reduction, Reuse and Recycling.

Originally waste disposal through municipal and regional governments was initiated by the Fouled Waste Clearing Law in 1900. Thus the elimination of Type I risks came to the fore to overcome sanitary problems in the towns which caused diseases like plague, dysentery, and other infectious diseases. This was followed by the Public Cleansing Law (PCL) in 1954 to ensure hygienic standards. The PCL and the Waste Disposal and Public Cleansing Law of 1970 are still the foundation for waste control.

Within the last 25 years the lifestyle of the Japanese have changed dramatically, not to mention trade and industry. Economic surplus and the resulting quantitative growth produced various kinds of waste as the last consequence.

Reduction

Japan's economic growth would have been impossible without the intensive utilization of imported resources. Thus Japan as a country poor in natural resources is responsible for the conservation of global resources. Resource conservation efforts are strongly demanded of the Japanese. Provisions for resource conservation will also have a significant effect on the reduction of the volume of waste. The Japanese, like all other "throwaway societies," should question the practice of throwing out serviceable goods simply because they are old or outdated. It should not be hard to find a common cause with the older generations to change the usual manner of consumption. Treating things with care and respect, and the ability to do without, was part of their daily life. But this is the opposite of living in throwaway societies these days. And the Japanese, being highly dependent on the resources

from their neighbors and other countries all over the world, should consider their influence on the environment of these countries and the global environment.

Reuse

The Japanese, like all other throwaway societies, should try to repair things more often without high material, financial, and labor expenditures. Many products are consciously designed so that it is easier and cheaper to buy new ones than to repair old ones, which is unacceptable. In the medium term is not acceptable to manufacture products unscrupulously so that it is cheaper to buy a new one than to repair. Deposits used for bottles in Germany will not be a solution for Japan owing to the lack of space for storing empty bottles in the small shops close to stations in Tokyo.

Recycling - A Solution?

To solve Japan's waste problem a new bill being prepared in the Japanese Parliament aims to substantially increase the quota of recyclable waste. The Ministry of International Trade and Industry (MITI) and the Ministry of Health and Welfare have put forward a bill in which the food and beverage manufacturers are called upon to account and be responsible for costs of recycling the packaging they use. But the Ministry of Agriculture, Forestry and Fisheries (MAFF), which is responsible for the food and beverage industries, is opposed.

MAFF drafted a rival version in which it calls for sharing the cost of recycling with packaging manufacturers. Eventually, the Japanese Parliament is likely to adopt a compromise, which splits the responsibility. It is no longer clear where the original responsibility for recycling lies and whether the ecological effect will be reduced.

Some environmentalists are critical, pointing out that the compromise bill illustrates the close cooperation between government and industry. Thus, it is a result of political and economic considerations, not environmental considerations. And the critics say that this is a classic example of the inability of the Japanese government to act decisively on environmental issues.

Under the new bill, all manufacturers and distributors of packaged goods will be liable for recycling their packaging. Many big companies are likely to fulfill this obligation by financing the new recycling companies and owning the main share of these companies, which will earn money from recycling. Consequently there will not be any economic pressure on them to reduce the amount of packaging. The estimated cost of collecting the packaging is indicated to be around 110 billion yen a year. These expenses will mean charging consumers more for waste management. The citizens of Tokyo are supposed to put their wastes into separate piles divided into burnable and unburnable. Furthermore, they are requested to collect newspapers, magazines, metals, and glass. But increasingly the officials are faced with growing carelessness.

The Environment Agency

The Environment Agency's Office of Environment Activities says that the government's order of priorities is to follow the BEP and thus reduce and reuse, and only lastly to recycle. Because the bill was first put forward by the Ministry of Health and Welfare, prompted by a growing shortage of landfill sites, and the bill's contents touch upon the responsibilities of other ministries, the Environment Agency (EA) has little input. The EA has limited authority over a wide range of environmental laws, including pollution control for individual factories, toxic wastes, and the regulation of sewage, waste disposal, and the like. But EA's position in the hierarchy of government ministries is far behind MITI, the Ministry of Finance, the Ministry of Foreign Affairs, and others. The lack of an organized environmental movement to counter the tightly organized industrial lobby

is the biggest problem for EA.

Conclusions

A bill to recycle waste cannot be a sustainable solution to solve Tokyo's waste problem. A lack of technical equipment (such as that for sorting the various kinds plastic, or that to remove ink from paper) and low-price recycling methods will make recycling unattractive in the medium term. Mass recycling will cause increased production of low-quality products that will more quickly end up joining the mountains of waste.

A solution to solve Tokyo's waste problem will not be easy. Various initiatives from politicians, industrialists, environmental activists, scientists, and citizens are needed. All of them have to review the practice of mass production, mass consumption, and finally mass disposal. To alleviate its waste problem, Japan needs to take many more steps. Incineration as a form of waste reduction and recycling will not be a long-term answer. In the long term, all "throwaway societies" have to accept a simpler lifestyle and less mobility. They have to produce less waste by reusing, repairing, and (not only!) recycling. They have to treat everything with care, not simply be slaves to fashion, and take on much more responsibility.

Source: *Japan Environment Monitor*, volume 85. (See this issue for Bibliography.)

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